

# Fixed Income Professional Certificate

Develop a complete set of desk-ready skills for fixed income market participants. You will learn how to determine fair values, yields and risk measures for a wide variety of instruments including government bonds, corporate bonds, mortgage securities and fixed income derivatives. Understand the structure and trading conventions of fixed income markets, and learn how to construct, interpret and trade the term structure of interest rates.

## **This Professional Certificate comprises the following courses:**

- Fixed Income Mathematics: Pricing and Valuation of Bonds (Days 1 and 2)
- Fixed Income Instruments and Markets (Days 3 and 4)
- Yield Curve Analysis (Day 5)

## **Prerequisite knowledge:**

- Intermediate MS Excel skills
- Elementary differential calculus
- Basic probability and statistics
- Basic familiarity with fixed income instruments

## **What You'll Learn:**

- Understand the 'no-arbitrage' principle employed in the valuation of fixed income securities
- Understand the limitations of 'yield-to-maturity' as a measure of the rate of return on default free fixed income securities
- Develop a 'no-arbitrage' interpretation of forward rates
- Develop a deep understanding of duration and convexity and be aware of common misunderstandings of these concepts
- Derive risk-neutral default probabilities from credit risky bond prices
- Understand the structure of fixed income markets
- Understand the mechanics of repurchase agreements
- Determine repo-implied forward prices
- Compute swap rates
- Derive implied swap rates from ED futures prices
- Learn how to compute a variety of credit spreads for corporate bonds
- Understand the mechanics of the TBA mortgage market
- Understand prepayment modeling for mortgages and mortgage-backed securities
- Understand the differences between spot curves, par coupon curves, forward curves, credit curves, etc.
- Determine expectations of future spot rates and the term premium
- Determine real rates, inflation expectations and the inflation risk premium
- Learn how to construct yield curve trades including steepeners, flatteners, barbells and bullets
- Understand the impact of changes in the Federal Funds rate on the shape of the yield curve

## **Who Should Take This?:**

Portfolio managers, fixed income traders, fixed income desk quants, research analysts, and financial analysts.

## Day 1

### MODULE 1: ESSENTIAL MATHEMATICS

- Geometric series
- Derivatives
- Taylor series
- Logarithmic and exponential functions
- (Easy) integrals

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### MODULE 2: BASIC INSTRUMENTS

- Zero coupon bonds
- Annuities
- Perpetuities
- Coupon Bonds: Bullets and amortizers
- Par coupon rates
- Floating rate bonds

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### MODULE 3: MEASURES OF YIELD AND RETURN

- Discount rates
- Yields
- Interest rates
- Rates of return: Expected, contractual and realized
- Yield-to-maturity: What it does and does not mean

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## Day 2

### MODULE 1: TERM STRUCTURES OF RATES AND YIELDS

- Forward rates
- Bootstrapping zeros
- Desirable properties of term structures
- Interpolation techniques
- Splines
- Yield curve fitting

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### MODULE 2: MEASURES OF RISK

- Taylor series and 'sensitivity' measures
- Macaulay duration
- Yield duration: Macaulay and modified
- Dollar duration
- Key rate duration
- Macaulay convexity
- Yield convexity

## MODULE 3: ELEMENTS OF FIXED INCOME PORTFOLIO RISK MANAGEMENT

- Duration of a portfolio
- Convexity of a portfolio
- Immunization
- Computing Value at Risk for fixed income portfolios

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## MODULE 4: CORPORATE BONDS

- Credit risk
- Inferring (risk-neutral) default probabilities from bond prices

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### Day 3

## MODULE 1: STRUCTURE OF FIXED INCOME MARKETS

- Primary markets
- Treasury auctions
- Interdealer brokers
- Secondary markets
- Electronic trading platforms

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## MODULE 2: US GOVERNMENT BONDS

- Treasury bills
- Treasury notes and bonds
- Yield conventions
- Risk parameters
- Accrued Interest: Clean and invoice (dirty) prices
- TIPS: Treasury inflation-protected securities

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## MODULE 3: SOVEREIGN DEBT INSTRUMENTS AND MARKETS

- Canada
- United Kingdom
- Europe
- Japan

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## MODULE 4: REPURCHASE AGREEMENTS

- Structure of Repo and Reverse Repo contracts
- Haircuts
- Repo arithmetic
- General and special collateral
- Repo fails

## MODULE 1: INTEREST RATE DERIVATIVES: FORWARDS AND SWAPS

- Forward rate agreements
- Forward contracts on bonds
- Structure of a swap contract
- Swap rates and curves
- Swap spreads
- Overnight index swaps
- Libor-OIS spreads
- Forward swaps

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## MODULE 2: INTEREST RATE DERIVATIVES: FUTURES AND OPTIONS

- Treasury futures
- Eurodollar futures
- Deriving swap rates from ED futures
- Options on ED futures
- Swaptions
- Interest rate caps and floors

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## MODULE 3: CORPORATE BONDS AND CREDIT DERIVATIVES

- Yields and credit spreads
- Risky floating rate notes
- Asset Swaps
- Credit default swaps

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## MODULE 4: MORTGAGES AND MORTGAGE-BACKED SECURITIES

- Types of mortgages
- Prepayments and negative convexity
- Federal agency debt securities
- The TBA market
- Securitization
- Agency MBS

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## MODULE 1: INTRODUCTION AND OVERVIEW

- Yield Curve Fundamentals
- Financial and Economic Implications
- Interpreting the Shape of the Curve, Supply, and the Business Cycle
- Risk Free Curves

## MODULE 2: A TAXONOMY OF CURVES

- Spot rate curves
- Swap curves
- Corporate curves
- Mortgage curves

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## MODULE 3: YIELD CURVE FITTING

- Fitting a curve to the bond market
- Plotting bond yields against the fitted curve
- Yield spreads to the fitted curve

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## MODULE 4: YIELD CURVE MODELING

- Interpretation and forecasting yield curve movements
- Fiscal and monetary policy
- Parallel yield curve shifts
- Non-parallel curve shifts (steepening/flattening/barbell)
- Econometric forecasting models
- Understanding and interpreting yield curves

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## MODULE 5: TRADING THE CURVE AND PORTFOLIO APPLICATIONS

- Yield curve strategies
- Total return analysis for yield curve shifts

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## MODULE 6: DESK READY SKILLS KNOWLEDGE CHECK